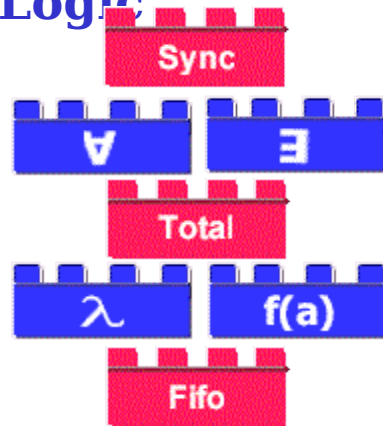


## Integrating Programs and Logic



## Impact

- Delivery of a means to correctly optimize Ensemble layers will demonstrate that formal methods can enhance real system performance.
- Proving the defining properties of key Ensemble layers will greatly enhance confidence in that system and its applications as well as increase its capabilities.
- Release of Ensemble with a Logical Programming Environment to support it will be a first-of-a-kind model of how a

## New Ideas

- Building a distributed communications system in a very expressive programming language with a formal semantics is the key first step for proving properties of actual system code.
- The key to effectively supporting a real system with formal methods is to build the system in a programming environment that seamlessly integrates proof technology.

- The modular structure of Ensemble

enables collaborative verification based on a common formal semantics definable in several verification systems.

**1998**  
**Spring**

**Fall**

**1999**  
**Spring**

**Fall**

**2000**  
**Spring**

**Fall**

## Schedule

- Deploy a correctly optimized stack in a running application.
- Complete verification of ETO layer in Nuprl, specify EVS layers, add to documentation of system.
- Integrate Ensemble into prototype Logical Programming Environment (LPE).
- Begin formal proofs of EVS properties.
- Complete proofs of EVS properties; add to documentation base for system.
- Integrate fastpath optimizer from Nuprl into LPE.
- Synthesize correct Ensemble layer from